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general use. Chapters III and IV include a discussion of the surface features which lead to the identification of strata and structural conditions; the methods of obtaining and recording geologic data; also the actual field procedure from the selection of the field party to the preparation of the final reconnaissance or detailed report.

The statement is made (p. 129) that "the field work of a petroleum geologist is . . . . made up largely of a search for anticlines and terraces, and of mapping such areas." This statement would have been more nearly correct a few years ago.

The book contains a glossary of about four hundred words, such as: Algonkian, Carboniferous, Cenozoic, Contours, Dip Slope, Orientation Rod, Stadia, Sedimentation, Volcanic Ash. There is also an appendix containing tables of natural functions, reductions of stadia observations for rod readings of 100, stadia tables for obtaining differences of elevations, gradienter table (Stebbinger drum) for determining distances, and a number of other tables, including barometric corrections.

A limp leather binding and pocket size make the book convenient for field use.

W. O. G.

Lithologic Subsurface Correlation in the "Bend Series" of North Central Texas. By MARCUS I. GOLDMAN. U.S. Geological Survey, Professional Paper 129 A, 1921, Govt. Printing Office, Washington. Pp. 22, pl. 1, fig. 1.

Since the early work of Hatch, the micro-petrology of sediments remained a rather neglected field to which the physiographer has only turned now and then in the exceptional instances when there was a question whether a certain sand was wind- or water-laid, a field almost wholly ignored by the stratigrapher. Now the subsurface lithologic correlations in oil fields have assumed economic importance, however, interest in the long-neglected subject is revived, and geologists are glad to learn of the establishment by the U.S. Geological Survey of a laboratory devoted to the study of sediments. The paper here reviewed represents an invaluable addition to the technology of petrographic correlation from well logs and well samples.

The problem presented was the correlation of sediments thought to be the equivalents of the Smithwick and Marble Falls beds and of a part of the Strawn formation of Pennsylvanian age, as well as of the Lower Bend Series (Mississippian) in north central Texas. The method employed was much like that outlined by Trager (*Econ. Geol.*, XV, 1920);

the more exact scheme of analysis described by Trager, however, was not resorted to. Depths from the surface are plotted as ordinates in ten-foot units and the composition in percentage of argillaceous, arenaceous, flinty, and calcareous sediments, as determined from the log samples, are the abscissae; the diagram thus constructed is essentially a graphic columnar section. Correlation is based on the relative increase or decrease of one type of sediment, rather than on the absolute percentage composition of the bed in question. A mere glance at the plate given serves best to illustrate the method used. Flinty sediments are taken to be equivalents of calcareous deposits, since the conditions under which they originally formed are similar.

Such ratios established a generalized sequence for the counties of Comanche and Palo Pinto (and probably also Eastland and Stephens, the intervening counties). This sequence follows:

Pennsylvanian	Strawn formation	=True Smithwick shale
	True "Upper Smithwick" shale	
	"Smithwick lime"	
	"Lower Smithwick shale" of the Ranger field	
	"Black lime" of the Ranger field	=True Marble Falls limestone
	A succession of limestones and sandy limestones, hitherto unnamed	
Mississippian	Lower Bend limestone	
	Lower Bend shale	

Unconformity
Ordovician—Ellenburger limestone

The entire Pennsylvanian and Mississippian (including the lower part of the Strawn) has an average thickness of 1,100 feet.

No marked unconformities are reported above that which separates the Ordovician and Mississippian, though eleven disconformities of varying importance, not indicated above, are recognized. Several are intraformational. In the case of the disconformities, glauconite and phosphate nodules in some cases mark the plane of separation. These glauconite grains are coarser and less rounded than those of the thick greensands of other horizons and resemble more closely those of the New Jersey Cretaceous. The occurrence of sulphides at the horizons marking ' akinetic" surfaces of maximum base-leveling is another noteworthy feature.

Many other interesting facts are discussed, and points of considerable theoretical significance are brought forward—such as the source of the oil in the north central Texas region, the northeastern source of the Bend sediments, and the very great trustworthiness of lithologic correlation in regions where faunas change slowly and sediments accumulate rapidly.

The one disappointment felt by the reviewer was due to the lack of explicitness in dealing with the technology of examinations. For novices a careful outline of the things to be sought for in making lithologic subsurface correlations would be helpful.

C. H. B., Jr.

Report on Mining Operations in the Province of Quebec, 1919. Province of Quebec, Canada, Bureau of Mines, 1920. Pp. 160.

The phenomenal growth in the mineral industries of Quebec is evidenced by the increase in the value of her annual mineral output from two and a half million dollars in 1900 to nearly twenty-one million dollars in 1919.

While metals contribute to some degree to this output, Quebec's most important resources are non-metallic—asbestos and building-materials dominating.

Asbestos is to be credited with over half of the total mineral output by value in 1919, the mines of Quebec constituting the world's principal source of this mineral. The United States is very directly interested in this Canadian industry because about 89 per cent of the output comes to the United States, mainly in an unmanufactured state, and is there fabricated for use in the United States and for shipment abroad. Some 3 per cent of the Canadian output is exported directly to England and the remainder to various other countries of Europe and to Japan.

The magnesite industry of Quebec, which came into prominence with the cutting off of the German and Austrian imports during the war, declined in 1919 to less than half the 1918 tonnage.

E. S. B.

Deposits of Iron Ore near Stanford, Montana. By L. G. Westgate. U.S. Geological Survey, Bull. 715-F, 1920. Pp. 85–92.

This report describes several bodies of low phosphorus-hematite ore in the northern part of the Little Belt Mountains. The deposits are as yet undeveloped. Tonnages at two of the best showings are roughly estimated at one and one and one-third million tons respectively.